

structure, their extraordinary variety and diversity, their beauty, form great attractions. To these may now be added the interest, indeed excitement, to be obtained by intelligent and judicious cross-fertilisation. Altogether we need not wonder that the cultivation of orchids is spreading rapidly among the garden-loving people of these isles. For they interest equally the man of science and the gardener. We trust that Mr. Fitzgerald may bring his labour of love to a successful termination, and that descriptions of the orchids of other parts of the world, equally complete, accurate, interesting, and intelligent, may be taken in hand by botanists equally competent and enthusiastic.

T. L.

GRINNELL LAND

THE following is the *Times* report of the paper read by Lieut. Greely at the British Association on Tuesday on some of the results of his recent Arctic expedition:—

Lieut. Greely stated that the geographical work of the Lady Franklin Bay Expedition covers nearly 3° of latitude and over 40° of longitude. Starting from lat. 81° 44' N., long. 84° 45' W., Lieut. Lockwood reached, on May 18, 1882, on the north coast of Greenland, lat. 83° 24' N., long. 40° 46' W. From the same starting-point he reached to the south-west, in May 1883, in Greely Fjord, an inlet of the Western Polar Ocean, in lat. 80° 48' N., long. 78° 26' W. The journey to the northward resulted in an addition to our charts of a new coastline nearly 100 miles beyond the furthest point seen by Lieut. Beaumont of the Royal Navy. It also carried Greenland over forty miles northward, giving that continent a much greater extension in that direction than it had generally been credited with. The furthest point seen on the Greenland coast was estimated at about lat. 83° 35' N., long. 38° W. There were no indications that the furthest point seen was the northern termination of Greenland. The newly-discovered coast resembled in many respects that of Southern Greenland; the mainland was intersected by many deep fjords, with numerous outlying islands. The interior of the country, as seen from an elevation of some 2000 feet, consisted of confused masses of mountains, eternally snow-clad or covered with ice-caps. The fjords presented to the eye nothing but broad, level expanses of snow and ice, being devoid of any marked ice-foot, floebergs, pressed-up hummocks, or any other indications tending to prove their direct connection with the Spitzbergen Sea. In general, the immediate coast was high, rugged, and precipitous; the formation very like that around Discovery Harbour—schistose slate, with a sprinkling of quartz. The vegetation resembled closely that of Grinnell Land. Among the specimens brought back is the Arctic poppy. Several saxifrages were identified above the 83rd parallel. Traces of the Polar bear, lemming, and Arctic fox were seen. A hare and ptarmigan were killed at the furthest north, and the snow bunting was heard. A remarkable fact noted was the existence of a tidal crack—so called for lack of a better name—which extended from Cape Bryant along the entire coast, running across various fjords in a direct line from headland to headland, varying from one yard to several hundred yards in width. Inside the crack, rough hummocky ice was but rarely seen, while outside prevailed the palæocrystic ice, over which Commander Markham struggled so manfully and successfully in his wonderful journey of 1875, midway between Capes May and Britannia. A sounding was made, but no bottom was found at 800 feet. Apparently no current existed. It may be well to state that the latitude of the furthest northern point, Lockwood Island, was determined by a set of circum-meridian and sub-polar observations, which were reduced by the Gauss method. The latitude of Cape Britannia and several other points was

determined by circum-meridian observations. It affords me pleasure to testify to the accuracy of Lieut. Beaumont's maps; the only correction made places Cape Britannia a few miles south and Cape May a few miles west of their assigned positions. These points were located by Lieut. Beaumont from bearings. His comparative exactness was remarkable considering the disadvantages under which he laboured. The journeys made by Lieut. Lockwood and myself across Grinnell Land into its interior revealed striking and peculiar physical conditions which have been hitherto unsuspected. Between the heads of Archer and Greely Fjords, a distance of some seventy miles, stretches the perpendicular front of an immense ice-cap, which follows closely from east to west the 81st parallel. Its average height was not less than 150 feet. The undulations of the surface of the ice conformed closely to the configuration of the country, so that the variations in the thickness of the ice-cap were inconsiderable in about sixty miles. But two places were found where the slope and face were so modified as to render the ascent of the ice possible. This ice-cap, extending southward, covers Grinnell Land almost entirely from the 81st parallel to Hayes Sound, and from Kennedy Channel westward to Greely Fjord on the Polar Ocean. The glacier discharging into Dobbin Bay is but an offshoot of this ice-cap. Without doubt glaciers can be found at the head of every considerable valley debouching into Richardson, Scoresby, or other bays. Several valleys which were visited during the retreat southward displayed at their entrances evident signs of such occupancy in the past. In July I was fortunate enough to ascend Mount Arthur, the summit of which is 4500 feet above the sea. The day was very clear; to the northward of Garfield Range a similar ice-cap appeared to view, from which extensive glaciers projected through every mountain gap. One of these, Henrietta Nesmith Glacier, had been visited by me in the preceding April, and was found to have a perpendicular face of about 200 feet. It discharged into a small bay, part of Lake Hazen. Gilmar, Abbé, and other glaciers feed the streams which empty into that lake. Similarly glaciers were found at the head of the rivers discharging into St. Patrick and Lincoln Basins, Norris Bay, and Discovery Harbour. From these indications I estimate the northern ice-cap of Grinnell Land as not far from 6000 miles in area. This southern limit closely coincides with the 82nd parallel. The country between the 81st and 82nd parallels, extending from Kennedy and Robeson Channels to the Western Polar Ocean, was found in July entirely free from snow, except on the very backbone. In over 150 miles travel into the interior my foot never touched snow. Vegetation abounded, being exceedingly luxuriant as compared with Cape Hawkes, Cape Sabine, or other points further south visited by me. Dead willow was found in such abundance as to serve for fuel in more than one instance. Willow, saxifrages, grasses, and other plants grew in such profusion as to completely cover large tracts of ground. These valleys afford excellent pasturage for musk cattle, which feed towards the sea coast during summer, but withdraw to the interior as winter advances. I frequently noted evidences of recent elevation above the sea of the region now free from ice-cap. Such indications consisted of raised beaches, marine shells, and driftwood. At one place the trunks of two large coniferous trees were found in such a state of preservation as to allow of their use for fuel. It seems probable that these ice-caps were originally united. It is certain that both the northern and southern ice-caps have recently retreated, even if such a process is not going on now. Along the frontier of the southern ice were found many small glacial lakes and moraines. To the north, Lake Hazen for some fifty miles borders the ice-cap. In front of Henrietta Nesmith Glacier there were three parallel moraines. Between the face of the glacier

and the main lake at the junction of Lake Hazen and Ruggles River I discovered the remains of permanent Esquimaux huts. Many relics were obtained at that place and at various points along the southern shore of Lake Hazen, but no traces of any kind were found on the northern shore of the lake. It is perhaps worthy of remark that reindeer, which must have been plentiful in that country, have entirely disappeared, having either migrated or become extinct. In connection with the line of perpetual snow I may state that on Mount Arthur it was not far from 3500 feet above the sea. From barometrical measurements it appeared that the crest of Grinnell Land was above 2500 feet elevation in front of the southern ice-cap, 3000 feet near Mount Arthur.

THE BRITISH ASSOCIATION

SO far as reports have reached us, the Montreal meeting has been a brilliant success, at least from the social point of view. The enthusiasm of the reception by the Canadians could not have been greater, and that enthusiasm, we are glad to notice, has met with a cordial response from the 800 members of the Association who went to Montreal. From the ample reports in the *Times* it is evident that, notwithstanding the many outside attractions devised by the hosts of the Association, the work in the Sections has in quantity and quality been up to the average. The proceedings began on Tuesday week with an address from the Mayor and Corporation of Montreal, and on Wednesday the Governor-General, Lord Lansdowne, welcomed the Association in a warm speech, in which the right keynote was struck. "If," he said, "you selected within the British Colonial Empire a spot for your meeting, you could not have selected a colony which better deserved this distinction either in respect of warmth of affection for the mother country, or the desire of its inhabitants for the diffusion of knowledge and culture. In a young country such pursuits are conducted in the face of difficulties, competition with material activity necessarily absorbing the attention of a rapidly developing community. We may claim for Canada that she has done her best, and has spared no pains to provide for the interests of science in the future. She has scientific workers known and respected far beyond the bounds of their own nation." Lord Lansdowne spoke warmly of the honour conferred upon Principal Sir John Dawson, who is more responsible than any other single person for the Association's visit. "We regard," he said, "the knighthood Her Majesty has bestowed upon him as an appropriate recognition of his distinguished services, and an opportune compliment to Canadian science. But the significance of this meeting is far greater than if measured merely by the addition it will make to the Empire's scientific wealth. When we find a society which for fifty years has not met outside the British Islands transferring its operations to the Dominion; when we see several hundred of the best-known Englishmen arriving here, mingling with our citizens and dispersing over this continent; when we see in Montreal the bearers of such names as Rayleigh, Playfair, Frankland, Sanderson, Thomson, Roscoe, Blanford, Moseley, Lefroy, Temple, Bramwell, Tylor, Galton, Harcourt, and Bonney, we feel one more step has been taken towards the establishment of that closer intimacy between the mother country and her offspring which both here and at home all good citizens of the Empire are determined to promote."

In introducing Lord Rayleigh as President, Sir William Thomson said:—

"It would have been a well-earned pleasure for my friend Prof. Cayley had he been able to visit Montreal, to introduce Lord Rayleigh to-night as his successor in the office of President of the British Association. Prof. Cayley has devoted his life to the advancement of pure

mathematics, and it is peculiarly appropriate that he should be followed in his honourable post by one who has made the brilliant applications of mathematical power to the discovery and illustration of natural phenomena with which Lord Rayleigh has enriched physical science. Lord Rayleigh's optical researches are of great value—notably his profound and searching mathematical investigation of the blue sky and the polarisation of light by reflection. His book on 'Sound' is the greatest and most important work which has yet appeared on the subject. His determination of the ohm, which constitutes the accurate foundation for the great modern science of electrical measurement, is of supreme importance not only in the scientific laboratory but in all practical applications of electricity, as in the telegraph cable factory and the signalling station, in electrical engineering works, in every practical application of electric light, electro-metallurgy, and the electrical transmission of power. With much pleasure I resign the chair for Prof. Cayley, and introduce Lord Rayleigh as President of the British Association."

The Royal Society of Canada presented an address of welcome to the Association, and the American Association sent a cordial invitation to the members to attend the meeting at Philadelphia. Over 200 were to go, leaving Montreal by special train this morning.

A brilliant reception was given on Thursday night by the Governors, Principal, and Professors of McGill University, and Saturday was devoted entirely to excursions. Prof. Lodge's lecture on "Dust" on Friday night was both scientific and practical, and appears to have been a great success. He did well to speak strongly to a practical people of the rewards of pure scientific research, though we trust that one result of the meeting will be to open the eyes of the Canadians to the utility of substantially encouraging such research.

One of the most notable incidents of the meeting seems to have been the reception given to Prof. Asa Gray in the Biological Section, where he read a paper on North American botany, one of the most remarkable papers, Prof. Moseley stated, ever read in that Section. When Prof. Gray rose to reply, he received a perfect ovation.

The Corporation of McGill University, in commemoration of the British Association meeting at Montreal, were to confer, at the closing meeting yesterday, the honorary degree of LL.D. upon the following prominent representatives of science:—The President, Lord Rayleigh; the following Vice-Presidents: the Governor-General, Lord Lansdowne; Sir John A. Macdonald, Sir Lyon Playfair, and Prof. Frankland; the General Secretaries, Capt. Douglas Galton and Mr. A. G. Vernon Harcourt; the Secretary, Prof. Bonney; the Sectional Presidents, Sir William Thomson, Sir Henry Roscoe, Mr. W. T. Blanford, Prof. Moseley, General Sir J. H. Lefroy, Sir Richard Temple, Sir Frederick Bramwell, and Dr. E. B. Tylor; also upon Prof. Daniel Wilson, President of Toronto University and the leading Canadian archaeologist; Prof. Asa Gray of Harvard, the leading American botanist; and Prof. James Hall, the State Geologist of New York.

Lieut. Greely made his appearance in the Geographical Section on Tuesday, and gave a detailed account of the geographical and scientific results of his recent Arctic expedition. His paper, however, was no mere sensation; what he told the meeting of the condition of Grinnell Land is of real scientific value. On another page will be found the report of Lieut. Greely's paper.

One practical result of the Montreal meeting is that the Association will offer a gold medal in the Department of Applied Science in McGill University as a memento of the visit. Moreover, Mr. Blanford proposed in the Geological Section that as some return for the way in which they had been received the members should contribute for the formation of science scholarships in McGill College.